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REPORT OF CHIEF OF BUREAU OF BIOLOGICAL SURVEY.

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF BIOLOGICAL SURVEY,
Washington, D. C., August 31, 1915.

SIR: I have the honor to submit herewith a report on the work of the Biological Survey for the fiscal year ended June 30, 1915.

Respectfully,

HENRY W. HENSHAW,
Chief, Biological Survey.

Hon. D. F. HOUSTON,
Secretary of Agriculture.

WORK OF THE BIOLOGICAL SURVEY.

During the year the work of the Bureau of Biological Survey was conducted along four principal lines: (1) Investigations of the food habits of North American birds and mammals in relation to agriculture, in charge of Dr. A. K. Fisher; (2) biological investigations with special reference to the geographic distribution of native animals and plants, in charge of E. W. Nelson; (3) supervision of national bird and mammal reservations, the preservation of native wild game, and the enforcement of the Lacey Act regulating the importation of birds and interstate shipment of game, in charge of Dr. T. S. Palmer; (4) administration of the Federal migratory-bird law, in charge of J. E. Mercer.

ECONOMIC INVESTIGATIONS.

FUR-BEARING ANIMALS.

Considerable progress has been made in experiments in the domestication of fur-bearing animals during the past year. The numbers of fur bearers continue steadily to diminish as their haunts are opened up to agriculture and as they are hunted even in the most inaccessible regions. Trappers are stimulated by the high prices pelts usually command, and it becomes increasingly evident that, if the more valuable furs are to continue to serve as wearing apparel, the supply must be obtained chiefly through artificial propagation.

Investigations of problems connected with the domestication of minks and martens were continued at Prichard, Idaho; Linden, Md.; and the National Zoological Park, and have been concerned chiefly with types of inclosures, effects of different foods on the development

of young animals and growth of fur, effects of light on the color and durability of fur, molting, inbreeding, hybridizing between subspecies, importance of taming the animals, and the practical bearing of individual temperamental differences. The results of these experiments are already sufficiently encouraging to warrant an extension to other fur bearers, native and foreign, and the establishment in the near future of a well-equipped breeding station at some suitable point in eastern United States having a climate requisite for producing high-grade fur.

Experiments in handling and dressing pelts of the different kinds of fur bearers have been undertaken and are still in progress with a view to recommending, for those wishing to tan or dress furs, the method most satisfactory and involving the least labor and expense.

A number of moleskins from the northwest coast have been secured and dressed. In size, beauty, and durability they easily surpass skins of eastern and European moles and undoubtedly are destined to become popular. Although moles are small and have such habits that it is not feasible to breed them in captivity, where they are numerous they are worthy of the attention of trappers.

Investigation into the subject of silver fox farming has continued and a bulletin on the subject will soon be ready for distribution.

PRAIRIE DOG REPRESSION.

Increased work was carried on in national forests and on the public domain in the extermination of prairie dogs. This work has now been practically completed in the Pike, Leadville, and Cochetopa National Forests in Colorado, the Alamo National Forest in New Mexico, the Sevier National Forest in Utah, and the Wichita National Forest in Oklahoma, where more than 95 per cent of the prairie dogs have been destroyed and wide stretches of valuable grazing lands entirely cleared of them. While invasion from adjacent areas is likely to occur, very little effort will be needed to keep the cleared areas free of the pest.

Active campaigns against prairie dogs are being conducted on the Rio Grande Forest in Colorado, the Coconino and Sitgreaves Forests in Arizona, the Custer Forest in Montana, and the Sioux Forest in South Dakota. Important field operations and demonstrations have also been conducted in Texas, South Dakota, Oklahoma, Wyoming, Colorado, and Arizona.

Oats poisoned by a process whereby the bitter taste of strychnine is largely eliminated have consistently given the best results. Usually more than 85 per cent of the prairie dogs on infested areas are killed by the first application of the poisoned grain, and on the Pike, Sevier, and Wichita Forests over 95 per cent of the animals were destroyed. The only exception to this highly successful work is the Coconino Forest, where the abundance of a species of blue-stem grass, of which the animals are very fond, causes the prairie dogs to care little for grain of any kind. Poisoning operations of last summer in this forest were made less effective by an unusual amount of rain, and not over 70 per cent of the prairie dogs were destroyed in the poisoning and repoisoning of the areas covered. During the year the work in the field has been so systematized that for the first time

the average cost of distributing poison on infested areas has been less than 5 cents per acre and repoisoning operations have not exceeded a cost of 3 cents per acre.

GROUND SQUIRRELS ON NATIONAL FORESTS.

In the California, Monterey, Sequoia, Kern, and Modoc National Forests of California, the Toiyabe Forest of Nevada, and Sopris Forest of Colorado work in controlling ground squirrels was carried on, and experimental work was conducted on the Columbia ground squirrel in Idaho. Cooperative work with the North Dakota Agricultural College has resulted in perfecting methods for the control of the Richardson ground squirrel, which has long been a costly pest to grain growers of North Dakota. Very successful demonstrations were made in many parts of the State.

EXPERIMENTS AND DEMONSTRATIONS IN DESTROYING WOLVES.

Demonstrations and experiments were carried on in Colorado, Nevada, Texas, Idaho, Oregon, and other of the Western States with a view to the control of wolves and coyotes. In eastern Oregon and northern Nevada, where rabies prevails among coyotes, careful study was made of the conditions, and a considerable number of hunters employed to assist in destroying the coyotes with a view to eradicating the disease. In this work the bureau cooperated with the State authorities of Oregon. The results are encouraging, and of late no new cases of rabies have been reported, and there is a very noticeable decrease in the number of coyotes. Demonstrations in Texas were very effective, and many dens were discovered and the young animals destroyed. Future work contemplates much extended activity and the division of the area inhabited by wolves and coyotes into districts, each in charge of a competent inspector, who will supervise closely the operations of trappers and hunters.

POCKET GOPHERS.

Experiments in the Ochoco Forest of Oregon demonstrated the practicability of exterminating pocket gophers in National Forests. Campaigns were carried on in a number of localities within the area inhabited by these animals.

JACK RABBITS.

Demonstrations were carried on during the winter in Oregon, Washington, Idaho, California, Nevada, and Texas against jack rabbits, which were devastating the young orchards and forage crops, and many thousands of rabbits were destroyed.

MOLES.

During the year an assistant of the bureau has made extensive studies of the life history of the mole inhabiting the Northwest, where moles are so abundant as to be seriously destructive in meadows

and truck gardens. Demonstrations for the purpose of informing farmers as to the best methods of controlling the pest were carried on in many parts of the region.

MOUNTAIN BEAVERS.

The same general region is inhabited by an animal known as the "mountain beaver" or "sewellel," which, until recently, has been of little economic importance. Lately, however, these animals have extended their operations into cultivated areas and have destroyed raspberry and blackberry bushes and also farm produce. Preliminary experiments for their control were conducted.

PINE MICE.

The pine mouse of the Eastern States, owing to the destruction of its natural enemies, has greatly increased in numbers and not only destroys seeds but feeds upon sweet potatoes and other tubers and upon the roots of fruit and shade trees. Preliminary experiments and demonstrations were made for the control of this rodent.

CRAWFISH IN MISSISSIPPI.

Demonstrations of methods for destroying crawfish, so injurious in Houston clay lands of Mississippi and Alabama, were continued during the year. The methods that have been worked out have proven so successful that perfect stands of cotton were secured on land that had previously been heavily infested and the crops destroyed by these pests. It is estimated that after the first thorough treatment lands can be kept free from crawfish at an annual expenditure of not to exceed 25 cents per acre.

MORTALITY AMONG WILD DUCKS IN UTAH.

For several successive years large numbers of wild ducks and other waterfowl around Great Salt Lake, Utah, have died, apparently from some disease, the exact cause, however, being unknown. As the destruction of waterfowl amounts annually to many thousands, the pecuniary loss is very great. During the summer of 1914 an assistant of the bureau carried on field investigations in the Salt Lake Valley, continuing until the end of October. Undoubtedly all the species of ducks that habitually feed in shallow water are more or less affected, but during the summer's work only nine affected species came under observation. The loss among them was very great. In 1912 nearly 45,000 dead ducks were picked up on one marsh.

It is of interest to note that the fatality is by no means confined to ducks, but includes many species belonging to widely different families, as grebes, herons, shorebirds, avocets, and stilts. The trouble during the present year began in July and terminated about September 20. The birds affected seem partially paralyzed, losing the power of flight, and gradually weakening until they die. The first clue to the nature of the trouble was obtained when it was found that affected ducks generally recover readily when given fresh water, and of 586 so treated in experimental pens 426 were entirely cured.

Further experiments and observations seem to prove beyond a reasonable doubt that the trouble arises from the presence in the water of an alkali that is absorbed through the alimentary canal in fatal quantities.

It was ascertained that a similar trouble exists at Tulare Lake, Cal., and results there also in the death of many waterfowl. An assistant engaged in the work visited this locality in November in order to study local conditions. A report on the progress made was published in May.

DESTRUCTION OF OYSTERS BY CERTAIN WILD DUCKS.

Examination of stomachs of wild ducks secured from near Olympia, Wash., definitely supported a charge that certain scaups and scoters were doing considerable damage locally to oyster beds. During the ducking season of 1914–15 investigations were carried on by an assistant of the Survey on the headwaters of Puget Sound and the whole of Willapa Harbor, and noteworthy damage was found to be confined to a single bay—Oyster Bay—18 miles northwest of Olympia, Wash.

Two species of ducks—the greater scaup, or bluebill, and the white-winged scoter, or coot—were found to be doing all the damage. The average numbers of these birds present on Oyster Bay during the season were 2,000 and 300, respectively. An estimate (subject to revision) was made that these ducks were destroying about 8,000 oysters daily, the money value of which would be $20. This would amount to about $3,600 for the duck season. Effective measures for relief are in force.

FOOD OF WILD DUCKS.

The work of the bureau in acquiring and disseminating information regarding the propagation of plants best suited for wild-fowl food has been greatly appreciated by game protective associations and individuals interested in the preservation and propagation of native wild fowl. In response to requests for information of this nature, a third publication in the series on important wild-duck foods was issued in May. This bulletin treats of 11 groups of plants, including 2 fresh-water plants of wide distribution in the United States; 2 of more southerly range; 2 trees of southern swamps whose abundant seeds are eagerly eaten by ducks; 1 strictly salt-water duck food, the first thus far recommended by the bureau; 1 brackish-water plant; and 3 others of such luxuriant growth as to be especially adapted for use on duck farms.

THE EUROPEAN STARLING.

The European starling, an introduced species, continues to increase in numbers and to occupy new territory. Reports of the bird's activities are somewhat conflicting. That it is to some extent beneficial is proven by its destruction of insects, especially in summer. In some localities, however, it is charged with the destruction of small fruit, and unquestionably its presence in numbers is inimical

to our native species that build in tree cavities and boxes, as wrens, martins, swallows, and flickers; and with these it is brought into direct competition. A circular has been widely distributed for the purpose of eliciting information as to the extent of territory the starling now inhabits and as to the amount of damage the bird inflicts on fruit.

Information on the economic importance of the bird has been sought during the year by means of letters and by the collection of stomachs. It is planned to carry on field investigations of the starling as soon as possible with a view to determining its status in the United States.

ATTRACTING BIRDS.

Bird lovers throughout the land are seeking ways and means of increasing the number of birds and of attracting them to the vicinity of homes. While the basis for this movement is in part esthetic, to no small degree such efforts are based on a growing appreciation of the usefulness of birds as insect destroyers. The increase of interest in wild birds throughout the United States during the past decade has been phenomenal, and organizations having for their chief object the care and protection of birds are numbered by hundreds, if not thousands. Civic leagues and women's clubs have been especially active in attempts to attract birds to city parks and suburbs, with a view to bringing wild life to the doors of those denied the privilege of knowing it in wilder districts. Two publications issued during the year designed to aid and advance this movement—"Bird Houses and How to Build Them" and "How to Attract Birds in Northeastern United States"—constitute manuals on the means of attracting birds and fill a widespread and continually growing demand. The bulletin discussing methods of attracting birds is the first of a series planned to cover all sections of the United States. Special attention is given to the kinds of fruit-bearing shrubs and trees important as furnishing food for birds.

ECONOMIC STATUS OF CERTAIN IMPORTANT SPECIES.

Examination of bird stomachs by groups was completed for mallards, wrens, thrashers, mocking birds, catbirds, chickadees, and titmice. In the case of cuckoos, crows, and jays the examinations were brought up to date. Intensive study of the common crow is being made with a view to supplying precise information as to its economic status.

In a publication issued in July on birds in relation to the alfalfa weevil it was shown that 45 species of birds prey upon this pest. Economic investigations of food habits of birds resulted in a bulletin on the food of the robins and bluebirds of the United States, and a revision, under the title "Some Common Birds Useful to the Farmer," of an earlier Farmers' Bulletin (No. 54) which has had a larger circulation than any other publication on American birds. Reports on the food habits of thrushes of the United States, on the birds of Porto Rico, and on some common birds of southeastern United States will soon be published.

BIOLOGICAL INVESTIGATIONS.

Biological investigations have been mainly along lines which supply information essential to the effective administration of the various activities of the bureau, including the enforcement of the Lacey Act regulating importation and shipment of game, the Federal migratory-bird law, maintenance of bird and mammal reservations, and economic investigations concerning the relations of birds and mammals to agriculture, stock-growing, and forestry. In securing information of practical value in connection with the conservation of our bird and mammal life, particularly in regard to the species of economic importance, a card-index file, consisting largely of unpublished data gathered by the field parties of the bureau, has been greatly increased. Manuscript field notes on mammals gathered during the past 25 years have been arranged in the card files, and for the first time have become readily available for reference. The files concerning North American birds now contain more than 1,000,000 cards.

DISTRIBUTION AND MIGRATION OF BIRDS.

Regular reports on the migration of birds have been received during the year from all parts of the United States from more than 300 volunteer observers and some from Canada and Alaska. These furnish invaluable records in connection with the administration of the migratory-bird law. Office investigation has included the collation and preparation for publication of material concerning the distribution and migration of gulls, terns, and rails and their allies and several other groups of birds. As rapidly as possible facts gathered in investigations of bird migration are being published that the information may be available for the use of those interested, particularly in connection with the formulation of laws for the protection of birds by the various States.

BIRD CENSUS.

The data secured by the first bird census, made in the spring of 1914, were studied and a preliminary report prepared and published. The results proved of extreme interest and showed the possibility of largely increasing the bird life throughout the country. A second national bird census was announced for the spring of 1915, and more than 200 voluntary observers took part in it, covering the country more generally than in the preceding year. The results of this work also will be prepared for publication. One of the most valuable facts developed by the bird census was that where an effort is made to protect birds from their enemies there is a notable increase of the bird population.

DISTRIBUTION MAPS OF BIRDS AND MAMMALS.

Work was continued on the preparation of distribution maps showing the area occupied by each species of bird and mammal in North America. A set of distribution maps of certain economically important birds and mammals was completed and is being exhibited at the Panama-Pacific International Exposition at San Francisco. Maps

showing the present and former ranges of the various species of game birds and mammals have proven extremely useful in connection with restocking areas in which the various species have become extinct.

DISTRIBUTION MAPS OF PRAIRIE DOGS.

During the first part of the year work was continued platting in detail the distribution of prairie dogs over a large area in eastern Arizona. This demonstrated that prairie dogs are rapidly extending their range and travel surprisingly long distances to locate new colonies, a few individuals being found sometimes from 6 to 8 miles from the nearest inhabited prairie-dog area. This shows the necessity for destroying scattered colonies of these pests in order to prevent rapid occupation of great areas of new country.

BIOLOGICAL SURVEYS.

Progress was made on the biological surveys of Oregon and North Dakota, in cooperation with local institutions. The survey of Alabama was nearly completed and a considerable advance made on that of Arizona. A final report with map on the biological survey of Wyoming was prepared for publication, and reports on the birds and mammals of New Mexico, based on the survey of that State, were nearly completed.

INVESTIGATIONS OF LARGE GAME ANIMALS.

Special attention is being paid to securing information and specimens for study concerning the large game animals of North America. The need of this is emphasized by the rapid decrease of certain species and their extermination throughout large areas where once they were plentiful. The bureau has had the active cooperation of a number of men who have visited remote districts in the United States, Canada, and Alaska for the purpose of securing information and specimens of large game, which they have freely contributed to the bureau. These expeditions have been made at the personal expense of the collaborators and the results secured have been of great value.

INVESTIGATIONS RELATING TO MIGRATORY WILD FOWL.

In connection with the administration of the migratory-bird law an investigation is being made of the food plants of wild fowl in their haunts, and at the same time of the present status of migratory species in various parts of the United States. The results, published together, will form an invaluable stock of information for use in connection with measures taken to increase the food supply of our wild fowl and otherwise to conserve this valuable national asset.

TECHNICAL INVESTIGATIONS.

A large number of birds and mammals were identified on request of State and other institutions and individuals throughout the country. A monograph of the marmots was published and technical studies of North American moles and pocket gophers were completed. Much work also was done on other groups of mammals, concerning the number of species of which and their relationships little was known.

GAME PRESERVATION.

NATIONAL BIRD RESERVATIONS.

Four national bird reservations were established during the past year—Dungeness Spit and Ediz Hook in Washington, Mille Lacs in Minnesota, and Blackbeard Island in Georgia—making a total of 70 reservations set apart to date, of which 67 are now in charge of the department. Recently it was deemed advisable to relinquish Blackbeard Island, and accordingly, on May 25, 1915, the order establishing this reservation was vacated by order of the President. With few exceptions conditions on most of the reservations where warden service is maintained during whole or part of the year have been very favorable for the increase of bird life.

Deer Flat, Idaho.—The warden stationed at this reservation reported on June 16, 1915, that he had discovered 50 pairs of pelicans nesting, the first time these birds have been known to breed there. Several species of ducks breed on or near this reserve, and this number will, no doubt, be considerably augmented in the future. The prime value of the reservation in the cause of bird protection is the refuge it affords to the thousands of ducks, geese, swans, pelicans, and other birds stopping here to rest and feed during migration.

Forrester Island, Alaska.—The bureau continues to maintain warden service on this reservation during the fishing season. The warden estimates that more than a third of a million water birds breed on the island, the species most numerous being the tufted puffin, rhinoceros auklet, ancient murrelet, California murre, glaucous-winged gull, forked-tailed petrel, and Kaeding's petrel, the last species numbering 100,000.

Anaho Island, Nev.—In the first official investigation of this reservation by an inspector of the bureau, in October, 1914, 29 species of birds were noted. The more common were the Farallon cormorant, coot, western meadowlark, and house finch. Pelicans, which also inhabit the island, had migrated at the time. Formerly Indians belonging to the Pyramid Lake Reservation, as well as tourists, raided the island during the nesting season and collected large quantities of pelican eggs. Warden service is now maintained during the nesting season.

Smith Island, Wash.—This reservation, comprising Smith and Minor Islands, is important as a refuge for thousands of brant during their migratory flights. Heretofore large numbers of these birds were illegally killed by hunters in power boats. Through the cooperation of the lighthouse keeper the birds are now unmolested.

East Park, Cal.—While investigating conditions on this reservation in March the inspector received information that at least a thousand swans had died in the vicinity of a 20-acre lake owned by the Butte Country Club near Live Oak, in the adjacent county. His report states that the lake is fed from the overflow of rice fields which have little water in them during early winter before the rainy season sets in. Late in January the swans sickened and in February many died. The cause of the mortality was not ascertained.

Hawaiian Islands Reservation.—Through cooperation with the Treasury Department, officers of the United States Coast Guard

cutter *Thetis*, stationed at Honolulu, made an investigation of the islands comprising this reservation, covering a period from March 18 to April 3. So far as noted the conditions of bird life on Bird Island, French Frigate Shoals, Lysianski, and Ocean Islands were normal, and there were no indications that the birds inhabiting these islands had been disturbed. On Laysan Island, however, it was discovered that poachers had been at work and that between 150,000 and 200,000 birds, consisting of the black-footed albatross, frigate bird, black-faced booby, and the Laysan albatross, chiefly the last-named species, had been killed for their plumage, the breast feathers only being taken. Apparently the smaller species were not disturbed, including the little colony of Laysan teal. The bird life of Laysan through this depletion is by no means wiped out, and no doubt in a comparatively short time will regain its normal strength, provided it can be protected from the atrocities of poachers. Owing to the remoteness of the islands and the cost of establishing a permanent warden service there, the protection of the reservation is exceedingly difficult. So far the department has been compelled to rely chiefly for the protection of the colonies on occasional visits of the Coast Guard cutter *Thetis*, which the Treasury Department has generously detailed for this service when possible.

Klamath Lake, Oreg.—After several years of negotiation practically all private holdings of land have been eliminated from the reservation. These eliminations do not in any way affect its value as a breeding place and refuge for bird life. Conditions on the reservation have been favorable, with the exception that on May 5 a tule fire burned from Midland south along the railroad grade to the straits and halfway to the lower lake, destroying many young geese, large numbers of ducks' nests, and young mink.

Lake Malheur, Oreg.—The warden in charge of this reservation has been furnished a new steel-frame rowboat and also a motorcycle, that he may more adequately patrol this very important bird reservation. Large numbers of waterfowl here find breeding and feeding places, as well as a safe refuge.

Reservations in Florida.—With but few exceptions, conditions on the various bird reservations in Florida remain favorable, and bird life is increasing. On Bird Key, Tortugas, it is estimated by experts who visited the island in May, that at the end of the hatching season there will be between 115,000 and 120,000 sooty and noddy terns on the rookeries. At Matlacha Pass thousands of Louisiana herons nested, and on other reservations as well this species seems to be increasing satisfactorily. At Indian Key there is a marked increase of all forms of bird life, and the reservation is growing in importance. On Passage Key fully 50 per cent of the birds were destroyed by a severe tornado which visited the island on June 9, uprooting many high trees; herons which nest in the tops of the trees suffered more severely than other birds.

MONTANA NATIONAL BISON RANGE.

An addition of 21 calves born during the past year brings the total number of bison now on the National Range to 137. The herd is in excellent condition. Elk and antelope continue to do well:

several young have been born, and the elk now number about 30 and the antelope 13. An unusually heavy rainfall during the spring has resulted in the heaviest growth of forage since the range was established. Fences have been kept in repair, irrigation ditches improved, and all other work necessary to the proper maintenance of the range carried on.

WIND CAVE NATIONAL GAME PRESERVE.

The work of properly maintaining the Wind Cave preserve is now being carried on in a satisfactory manner, and a permanent warden has been appointed through civil-service examination. The construction of an 88-inch woven-wire fence, 8.67 miles in length, was completed in November, inclosing 4,160 acres of land. Through the generosity of the Boone and Crockett Club 13 antelope were added to the preserve on October 18, the animals, in charge of an agent of the bureau, being shipped without loss or injury from Brooks, Alberta, Canada. Since the last annual report the number of buffalo was increased by the birth of 4 calves. The total number of animals now on the preserve is 40—16 buffalo, 9 antelope, 14 elk, and 1 deer. Losses by death during the year were 2 buffalo (including 1 calf), 3 elk, and 4 antelope. The condition of the remaining animals is excellent, and the outlook for an interesting and valuable preserve is encouraging.

NIOBRARA GAME RESERVATION.

By reason of its advantageous location, the Niobrara preserve gives promise of becoming one of the most important under the supervision of the bureau. The continued large number of visitors to the preserve during the summer months—3,563 during the calendar year—indicates that so far as public interest is concerned no mistake was made in its establishment as a bird reservation and game preserve. Conditions continue to improve and the warden in charge reports excellent prospects for harvesting a good crop of grain and hay to feed the animals. During the year 1 buffalo and 7 elk calves were born. The animals now number 41, and comprise 11 buffalo, 28 elk, and 2 deer, all in good condition. As they become more accustomed to their surroundings the animals will, no doubt, increase rapidly. Losses reported during the past year included the death of 1 male elk calf during the severe winter, and 2 deer—a doe and a buck, the doe being killed by lightning and the buck dying from unknown causes. There are now 7 Canada wild geese, 4 having been lost, 2 by escape from the reservation and 2 by death during the winter. The unusually stormy winter caused the loss of nearly all the pheasants.

WYOMING ELK REFUGE.

With the purchase of a tract of land in Jackson Hole, consisting of 1,240 acres (known as the Miller Ranch), preparations were made at once for active work at the Wyoming Elk Refuge. An agent of the bureau was put in charge, and necessary maintenance equipment, including a team of horses, was purchased. Negotiations are in progress for the purchase of an additional 520-acre tract, which, with the 840 acres of vacant public lands already set apart for this refuge, will make a total of 2,600 acres. Sufficient hay land is thus secured to insure a crop for feeding a large number of elk during the winter.

FEEDING AND TRANSPORTING ELK.

For the first time since the Government has undertaken the work of feeding elk in the Jackson Hole region, Wyoming, the winter in that section was so mild that elk did not migrate to the feeding grounds. Consequently feeding was unnecessary, and, as there was no chance of capturing animals for transportation, no shipments from this region were made. The elk came down no farther than the foothills, and by March 1 practically all had returned to the mountains. The losses resulting from "winterkilling" were, therefore, below normal, but about the usual number are estimated to have been killed by wolves during the winter months. Through cooperation with the Department of the Interior and the Forest Service, 75 elk from the Yellowstone National Park were shipped under the supervision of an agent of the bureau—25 to Utah and 50 to Colorado.

IMPORTATION OF BIRDS AND MAMMALS.

War conditions in Europe have resulted in a very noticeable falling off in the importation of birds and mammals. Only 454 permits were issued during the year, a decrease of 75 from 1914. The inspections numbered 150, as against 211 in 1914, and only 270,050 birds and 3,463 mammals were imported under permit. Among these were 216,037 canaries, 7,080 partridges, 15,841 pheasants, 5,345 miscellaneous game birds, and 25,747 nongame birds. Besides these, 46,095 birds and 104 mammals requiring no permits were admitted to entry, making a total of 316,145 birds and 3,567 mammals. At Honolulu only 37 permits were issued, for the entry of 191 birds, principally parrots. Two cases of entry of prohibited species were reported during the year: One mongoose, consigned to Prospect Park, Brooklyn, N. Y., was refused entry at the port of Philadelphia in November, and another, which had been inadvertently admitted from Calcutta, was discovered in San Francisco and reexported in January.

The issuing of permits for the importation of quail from Mexico was resumed November 1, 1914, under regulations which require the birds to be held in quarantine for a certain period at the port of Brownsville, Tex., the quarantine regulations being under the supervision of inspectors of the Bureau of Animal Industry. On January 6, after 3,341 quail had been permitted entry, disease was discovered by the inspectors and further importations were suspended. An investigation made by the Survey showed that of the total number of birds imported from Mexico about one-third died from disease. It is expected to resume issuing permits for the entry of quail from Mexico about November 1, 1915, under certain quarantine regulations.

INTERSTATE COMMERCE IN GAME.

During the year there were reported to the solicitor's office 27 cases of violations of sections 242, 243, and 244 of the criminal code, known as the "Lacey Act," relating to interstate traffic in game. These involved violations of law in the States of Arkansas, Delaware, Indiana, Iowa, Kentucky, Michigan, Mississippi, Missouri, Tennessee, Virginia, West Virginia, and Wisconsin.

The cases now pending in court number 37 and those under investigation, 38. In one case pending in Missouri evidence was ob-

tained disclosing a systematic plan to violate the law in shipping ducks to market in the adjoining State of Illinois. The evidence showed not merely a violation of the Lacey Act, but a conspiracy to accomplish the shipment of ducks out of the State, and the shippers were so charged. This is one of the most important cases which has developed under this act, and the first in which evidence of a conspiracy has been obtained. In the event of a conviction the deterrent effects are likely to be far-reaching.

Recent occurrences in Arkansas, one of the most important centers for the shipment of waterfowl in the Mississippi Valley, are likely to curtail very decidedly future shipments of game from the sunken lands in the northeastern corner of the State. The State supreme court has decided that a local law applicable to Mississippi County, under which shipments of waterfowl have hitherto been made, was unconstitutional, and that the State law prohibiting export of game was applicable to the counties generally. At the recent session of the legislature provision was made for the first time for the appointment of a State game commission to enforce State laws.

The State of Illinois has also amended its game law prohibiting sale of game, whether taken in or out of the State, thus closing the important market of Chicago. These changes will greatly facilitate the work of the department in the Mississippi Valley and make much more difficult the evasion of State and Federal laws regulating shipment of waterfowl.

INFORMATION CONCERNING GAME LAWS.

The index to game legislation has been kept up to date and memoranda of the important game laws prepared. The annual directory of game officials and the summary of game laws for 1914 were issued, and also four sets of ready-reference card maps containing information in condensed form of particular interest to various State game officials.

FEDERAL MIGRATORY BIRD LAW.

Under the Federal migratory-bird law, approved by the President March 4, 1913, the regulations fixing close seasons on migratory game birds were prepared and promulgated October 1, 1913, and amended October 1, 1914. During the year the number of district inspectors was increased from 15 to 17, and the warden force from 172 to 196. Cooperation with the game departments of most States has resulted in the better enforcement of State laws and Federal regulations. Since the law went into effect 470 alleged violations have been reported by district inspectors and Federal wardens, but in many cases the evidence was too meager to justify prosecution; 53 cases have been referred to the Department of Justice for action; fines were imposed in 12 cases, 9 cases were dismissed, and the remainder are still pending. In two United States district courts the law has been held unconstitutional: (1) In the eastern district of Arkansas, May 1914, in the case of United States *v.* Harvey C. Shauver, charged with violating Regulation No. 9; and (2) in the district of Kansas, on March 20, 1915, in the case of United States *v.* George L. McCullagh, charged with violating the same regulation.

That the violations reported by no means approximate the number that have occurred is to be expected and is due to the impossibility, in many cases, of procuring evidence sufficient to convict. Inspectors and wardens appointed under authority of this law have no power of arrest or search, and hence many violators escape. A further difficulty is that the limited number of inspectors necessitates unduly large districts, some of them difficult of effective patrol.

As the activities of the inspectors have been confined mainly to "trouble zones," very large sections have necessarily been left without supervision, but in such instances State authorities, cooperating with Federal wardens, have rendered efficient assistance. The law has proven exceedingly popular with the people at large, and with a considerable percentage of sportsmen. During the course of the year the bureau has received a large number of petitions, requests, suggestions, and protests touching various regulations, chiefly urging longer seasons and spring shooting. All of these will receive careful attention when amendments or changes of the present regulations are considered. With a few notable exceptions, the State legislatures, 43 of which have been in session this year, have made progress in line with the Federal law and regulations.

Notwithstanding many violations of the regulations in different sections of the country, the law was generally observed by sportsmen, and as a consequence chiefly of the cessation of spring shooting waterfowl and shorebirds passed to their northern breeding grounds in greater numbers than for many seasons. The general observance of the prohibition of spring shooting resulted also in the breeding of many thousands of ducks in certain localities where they have not nested for many years. These results following the enforcement of the law are an earnest of the results to come.

PUBLICATIONS.

Publications during the year, in addition to miscellaneous circulars and announcements, arranged by the division preparing them, were as follows:

ECONOMIC INVESTIGATIONS.

Department Bulletins:
- No. 107. Birds in Relation to the Alfalfa Weevil.
- No. 171. Food of the Robins and Bluebirds of the United States.
- No. 205. Eleven Important Wild-Duck Foods.
- No. 217. Mortality Among Waterfowl Around Great Salt Lake, Utah.

Farmers' Bulletins:
- No. 609. Bird Houses and How to Build Them.
- No. 621. How to Attract Birds in Northeastern United States.
- No. 630. Some Common Birds Useful to the Farmer.
- No. 670. Field Mice as Farm and Orchard Pests.

BIOLOGICAL INVESTIGATIONS.

North American Fauna:
- No. 37. Revision of the American Marmots.

Department Bulletins:
- No. 128. Distribution and Migration of North American Rails and Their Allies.
- No. 185. Bird Migration.
- No. 187. Preliminary Census of Birds of the United States.

Yearbook Separate, 1914:
- No. 642. Our Shorebirds and Their Future.

GAME PRESERVATION.

Farmers' Bulletin:

No. 628. Game Laws for 1914.

Biological Survey Document:

Directory of Officials and Organizations Concerned with the Protection of Birds and Game, 1914.

Reports now in process of publication or partially completed include a report on the Birds of Porto Rico; North American Faunas on Revisions of American Moles, of Pocket Gophers, of Prairie Dogs, of Rice Rats, on the Biological Survey of Wyoming, and on the Birds of Texas; Department Bulletins on Silver Fox Farming, Food Habits of Thrushes and of Swallows, and on the Distribution and Migration of North American Gulls and of Terns; and Farmers' Bulletins on How to Attract Birds in Northwestern United States, Habits and Economic Status of Southern Birds, of Pocket Gophers, of Cottontail Rabbits, and of Wolves and Coyotes.

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